The Takeaway
Policy Briefs from the Mosbacher Institute for Trade, Economics, and Public Policy

# The Latest Unanticipated Consequence in the Ethanol Fiasco

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*Until recently, the 2007 ethanol mandates have been a story of very small environmental and security benefits and large, unexpected increases in food prices, as corn was diverted from food to fuel uses.[1] Now we have another unforeseen consequence — falling gasoline consumption has made it impossible to meet the ethanol mandates and stay within the blend wall of a 10% limit on ethanol content in gasoline. To meet ever-increasing ethanol mandates, the EPA initially approved the use of 15% ethanol (E15) only to receive a vigorous push-back from auto manufacturers. Using E15 would void their new car warranties. Then on November 15, EPA proposed a temporary relaxation in the mandated ethanol targets enabling the continued use of E10. The EPA has found itself between the proverbial rock and a hard place. How did the EPA find itself in this predicament and what are the solutions?*

## ETHANOL MANDATES ASSUME RISING GAS CONSUMPTION

When the 2007 ethanol mandates were passed, lawmakers were looking at forecasts of rising gasoline consumption out to 2022 and beyond. Washington reasoned that with growing gasoline consumption, mandating sharply rising ethanol content in gasoline was achievable with most vehicles using E10 gasoline. Shown on the left scale of Figure 1 was the Energy

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## WHAT'S THE TAKEAWAY?

**The 2007 mandates to steadily increase ethanol content in gasoline have hit yet another roadblock.**

**Falling — instead of rising — gasoline consumption means that fuel blenders can no longer absorb the mandated ethanol quantities and still produce gasoline with no more than 10% ethanol content.**

**Auto manufacturers strongly object to raising the ethanol content above 10%.**

**Now, the EPA has proposed a one-time, one year waiver relaxing the 2014 mandate.**

**A better solution would be to eliminate ethanol mandates altogether.**



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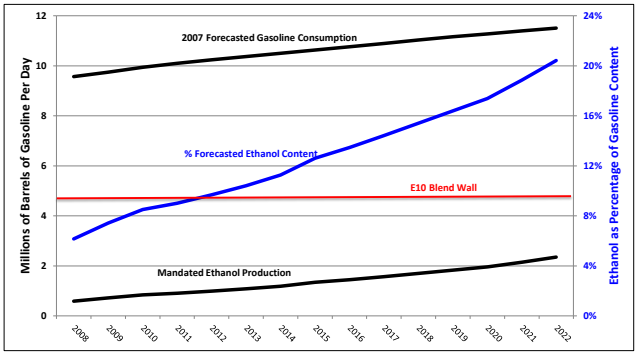
Information Administration's (EIA) 2006 gasoline consumption forecast. The EIA predicted that 2007 gasoline consumption would rise from 9.6 million barrels per day (MMB/D) and would grow to 11.5 MMB/D by 2022 — a 20% increase. At the time of the 2007 legislation, ethanol production stood at 0.6 MMB/D – or 6% of the volume of gasoline. The 2007 ethanol mandates called for the consumption of ethanol to rise from 0.6 MMB/D to 2.35 MMB/D by 2022 (See left scale on Figure 1). This meant that by 2022, the average gasoline blend pool would contain about 20% ethanol (See right axis of Figure 1).

Figure 1: The Future as Looked at in 2007




Source: U.S. Department of Energy. Energy Information Administration. 2007. *Annual Energy Outlook 2007.* Washington, D.C.: Department of Energy.

Initially, Washington's plan worked. Reformulated gasolines absorbed the mandated ethanol volumes that stayed under the E10 blend wall (E10). But the mandated ethanol volumes ratcheted up over time, and eventually, staying under the E10 blend wall would not be possible. With an E10 blend wall, the full volume of ethanol mandated could no longer be met. To remain compliant with the 2007 mandates, the EPA devised a clever incentive system which would force gasoline blenders to produce a mix of both E10 and E85 (85% ethanol), thus achieving the desired ethanol production target. Most consumers would buy E10, and a relatively small fraction would buy E85. Based on these forecasts if E85 flex-fuel vehicles increased to just 14% of the automobile fleet by 2022, and 86% of vehicles continued buying E10, the overall 20% blend average shown in Figure 1 would be satisfied. The regulators had struck a precarious balancing act; unfortunately, it was based upon faulty forecasts.

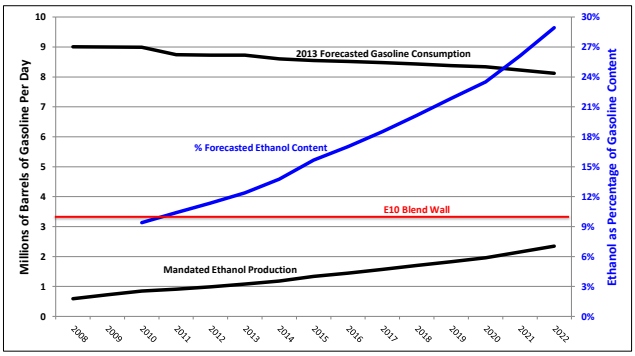
> *The 2007 ethanol mandates were based upon faulty gasoline consumption forecasts.*

**Effects of Falling Gasoline Consumption**

Contrary to the forecasts, gasoline consumption has not grown as expected. Instead of increasing to 11.5 MMB/D by 2022, gasoline consumption has been declining. The EIA now believes that gasoline consumption will decline to 8.1 MMB/D by 2022. Figure 2 (left axis) shows the most recent EIA gasoline consumption forecast which is wildly different from the 2006 forecasts shown in Figure 1. New more fuel efficient vehicles are making a big difference. As these new vehicles replace the older less fuel efficient vehicles, further reductions in consumption can be anticipated.

> *What does declining gasoline consumption imply about % ethanol in the blend pool?*

Figure 2: 2013 Looking Forward




Source: U.S. Department of Energy. Energy Information Administration. 2013. *Annual Energy Outlook 2013.* Washington, D.C.: Department of Energy.

But what does declining gasoline consumption imply about the percentage of ethanol in the blend pool? Figure 2 (right axis) shows the expected *percentage* of ethanol content in the future gasoline blend pool. Note that the latest forecast of future gasoline consumption implies that by 2022, 28% of the gasoline blend pool must be made up of ethanol instead of the 20% based on the original forecasts.

In all likelihood, the 2013 EIA gasoline demand predictions are likely to prove too optimistic about gasoline's future. They do not factor in the substitution to natural gas powered vehicles. Because compressed natural gas is likely to be much cheaper than gasoline, it is only a matter of time before the infrastructure is completed to allow this substitution. For example, if substitution to natural gas powered vehicles impacted only 12% of the vehicle fleet by 2022, this would further trim gasoline consumption from 8.1 MMB/D to 7.1 MMB/D by 2022. Even with this small increase in the share of natural gas powered vehicles, the ethanol content of the gasoline pool could rise to 34%, posing an even greater problem for the future viability of E10 and E85 gasoline.

## Will E85 Flex-Fuel Vehicles Save the Day for Ethanol?

Even if the ethanol content of the gasoline pool rises to only 28%, it will mean that the number of vehicles using E85 must rise to 24% of the vehicle fleet (versus 14% originally forecast in 2007). If one factors in likely natural gas displacement of gasoline, the fraction of E85 vehicles would be about 31% of the gasoline -power vehicle fleet. This leads to the question: "Is it realistic to assume that E85 flex-fuel vehicles will make up between 24 and 31% of the gasoline powered vehicles in 2022?"

To date, sales of flex-fuel vehicles capable of burning E85 have languished as a share of the total gasoline consuming vehicle fleet. In 2012, the share was only 4.7% of new vehicle sales and this was only accomplished with a variety of federal incentives to buy flex-fuel vehicles. Despite these incentives, sales of E85 were less than 100,000 barrels per day—or about 1% of total gasoline supplies in 2012.

If consumers aren't willing to buy flex-fuel vehicles, regulators have seized on the idea of raising the blend wall from a 10% maximum to a 15% maximum ethanol content or from E10 to E15. Initially, this change would help to alleviate the immediate problem. Nevertheless, even if E15 were to replace E10 as the new blend wall, E15 just delays the inevitable. Even with E15, by 2022 the percentages of E85 flex-fuel vehicles would still have to rise to between 19% and 27%.

## But Is an E15 Blend Wall Even Feasible?

Already, there is considerable political opposition to E15. It is not just Joe homeowner, whose lawnmower, snow blower, weed eater, and chainsaw don't like what E15 does to them. According to the Auto Alliance, an auto industry trade association, higher concentrations of ethanol could damage the engines of roughly 5 million cars.[2] AAA CEO Robert Darblenet has stated that 95% of vehicles currently on the road could suffer engine damage from using E15.[3] Vehicle manufacturers including Chrysler, Toyota, Nissan, BMW, and Volkswagen have stated that

use of E15 in their vehicles will void the customer's warranty.[4]

### If E15 Isn't Feasible, What about a Temporary Waiver?

Fortunately, the EPA has recognized the problem and has proposed a one-time relaxation of the ever increasing ethanol mandate for 2014. It will reduce the 2014 mandated requirement from 18.15 billion gallons of ethanol to about 15 billion gallons.[5] If implemented, it will provide a short run sedative, but no long term solution.[6] After 2014, the mandated ethanol use in gasoline would revert back to the scheduled increases. If that happens, we see from Figure 2, that E15 will only be a temporary stop on the way to E20 and beyond.

### The Permanent Solution is in Congress' Hands

Even though the 2007 ethanol legislation had good intentions, its intended beneficial aspects—on gasoline prices, CO2 emissions, and oil security—have been minimal. The unintended consequences on world food prices have been large and perverse. Now, with declining U.S. gasoline consumption, it is apparent that the mandates cannot even be practically met. The EPA should not and cannot be expected to solve this problem. Congressional action is needed and there is reason to be hopeful. There are several bills pending with bi-partisan sponsorship. The wisest course of action is to completely dismantle the mandates and their corresponding regulatory burdens.

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**Sources**

[1]See J.M. Griffin, "U.S. Ethanol Policy: Time to Reconsider?" *The Energy Journal,* Fall 2013, pp. 1-24.
[2]Eric Everts, *Consumer Reports* (May 17, 2012)
[3]William La Jeunesse, Fox News (May 7, 2013), http://www.foxnews.com/pollitics/2013/05/07auto-makers-warn-new-ethanol-mandate-could-damage-cars/.
[4]Hasib Nucjm Daily Tech (July 1,2013). http://www.dailytech.com/House+Ponders+E15+Rollbacl+Amid+Risk+of+Engine+Damage/article31869.htm
[5]Washington Post, "Ethanol takes policy blow from the Environmental Proetection Agency." November 17, 2013. http://www.washingtonpost.com/opinions/ethano-takes-policy-blow-from-the-environmental-protection-agency/.
[6]See Lucian Pugliaresi, "Up Against the Blend Wall: Examining EPA's Role in the Renewable Fuel Standard," June 5, 2013 testimony to the Subcommittee on Energy Policy, Health Care, and Entitlements.

## ABOUT THE MOSBACHER INSTITUTE

The Mosbacher Institute was founded in 2009 to honor Robert A. Mosbacher, Secretary of Commerce from 1989-1992 and key architect of the North American Free Trade Agreement. Through our three core programs – Integration of Global Markets, Energy in a Global Economy, and Governance and Public Goods – our objective is to advance the design of policies for tomorrow's challenges.

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